



# **ACE-PREVENTION PAMPHLETS**

# INDIGENOUS POPULATION RESULTS PAMPHLET 1 COST-EFFECTIVENESS OF LOWERING CHOLESTEROL AND BLOOD PRESSURE FOR PREVENTION OF CARDIOVASCULAR DISEASE IN INDIGENOUS AUSTRALIANS

### 1. MAIN MESSAGES

- Interventions to prevent cardiovascular disease in the Australian Indigenous population have the potential to greatly reduce the Indigenous health gap.
- The polypill could address up to 23% of the cardiovascular disease health gap if delivered through Aboriginal Community Controlled Health Services (ACCHS) and up to 15% if delivered through mainstream services. This can be achieved at cost savings, and is strongly recommended.
- Addressing Indigenous health inequities will require additional investment in the delivery of health interventions via appropriate services.
- More total health gain can be achieved if interventions are delivered to the Indigenous population via ACCHSs compared to mainstream GP health services, and although these appear to be less 'cost-effective', such investment should be considered on equity grounds.
- Similarly, although less cost-effective, equity concerns dictate that investments are still warranted in remote as opposed to non-remote areas.
- It is important to consider broader concepts of benefit beyond the DALY for the Indigenous population, where in addition to changes individual health, community and socio-cultural benefits also play an important role.

# 2. BACKGROUND

The health of Australia's Aboriginal and Torres Strait Islander population is significantly below that of the general Australian population. The Indigenous population in 2003 had a life expectancy 13 years lower and mortality rates more than three times higher than non-Indigenous Australians according to the Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples study. This differential has been termed the 'Indigenous health gap'. Cardiovascular disease (CVD) is the major disease group contributing to this gap in adults, comprising 23% of the total health gap (measured in Disability-Adjusted Life-Years or DALYs), and making up 17% of all Indigenous DALYs more generally. Thus CVD is a leading cause of Indigenous health disadvantage, and this has significant impacts on the costs of disease treatment, quality of life, and health equity.



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NHMRC GRANT NO. 351558 PROJECT LEADERS PROF THEO VOS (UQ) PROF ROB CARTER (DEAKIN) PAMPHLET AUTHOR KATHERINE ONG

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### 3. INTERVENTIONS

Although there is a large amount of evidence on the efficacy/effectiveness of interventions to prevent cardiovascular disease at a broad Australian population level, a review of the literature revealed limited evidence specific to the Indigenous population. To make our analyses more appropriate we collected detailed information on the costs and utilisation of ACCHS. We have named this the Indigenous Health Service Delivery (IHSD) Template. The template allows us to adapt the way interventions are modelled from mainstream to the Indigenous setting. This template is still a prototype, so please note that results remain preliminary. We selected one Indigenous-specific intervention and four additional interventions that we adapted using the IHSD Template. Pharmacological interventions were selected as an initial example, as their simpler structure was easier to adapt using the Template.

- 1. Looma healthy lifestyle: This was the only Indigenous specific intervention identified in the literature with sufficient information available to allow economic evaluation. This remote community based intervention involved encouragement in physical activity and healthy eating practices which resulted in a population wide reduction in serum cholesterol levels.
- 2. Statin treatment: 40mg of statin medication is given to each individual, in conjunction with monitoring and follow-up with general practitioner visits and blood tests. The IHSD Template has been used to adapt this intervention to the Indigenous setting.
- 3. ACE inhibitor treatment: An ACE inhibitor is given to each individual, in conjunction with monitoring and follow-up with general practitioner visits and blood tests. The IHSD Template has been used to adapt this intervention to the Indigenous setting.
- 4. Low dose diuretic treatment: A low dose diuretic medication is given to each individual, in conjunction with monitoring and follow-up with general practitioner visits and blood tests. The IHSD Template has been used to adapt this intervention to the Indigenous setting.
- 5. Polypill treatment: A polypill combining in one pill: an ACE inhibitor, beta blocker, statin, aspirin and folate is given to each individual, in conjunction with monitoring and follow-up with general practitioner visits and blood tests. The IHSD Template has been used to adapt this intervention to the Indigenous setting. As this is currently an experimental preventive measure, a range of potential prices have been evaluated (\$50, \$100, \$150, \$200, \$500) to assess the impact of price on cost-effectiveness results.

For each of the above interventions (apart from Looma), economic evaluations have been modelled for the Indigenous population with health service delivery via both mainstream GP services and ACCHSs, and also by remoteness.

#### 4. CHOICE OF COMPARATOR

The comparator is 'do nothing'. As currently blood pressure and cholesterol using drugs are being used it requires a hypothetical backcalculation of what disease rates would have been in the absence of such treatments. There is no direct information on current levels of cardiovascular medication usage in the Indigenous population, so an assumption needs to be made based on that of the general population. Adjustments can be made according to differences noted in cholesterol lowering medication use by socio-economic status and remoteness to approximate Indigenous current practice.

### 5. INTERVENTION COST-EFFECTIVENESS

Due to the unavailability of individual level CVD risk factor data for the Indigenous population, the above interventions could not be modelled to specifically target individuals at high risk; rather the interventions have been modelled as being applied to the entire Indigenous population aged 35 years and above. Consequently, the cost-effectiveness ratios we present for the Indigenous population are higher than if they had been specifically targeted to individuals at high risk of CVD. Thus, results cannot be directly compared with those for the high CVD risk groups in the general Australian population in the ACE-Prevention series. However, the Indigenous results can be compared against each other.

The cost-effectiveness results are presented in Tables 1 and 2. Although presented in league table format, it is important to consider that there may be other benefits accruing as a result of the interventions which are not captured by the DALY outcome measure. For example, interventions delivered via ACCHSs and the Looma Healthy Lifestyle intervention appear to be less cost-effective, yet the analysis does not take into account broader concepts of benefit such as 'community health gain', 'cultural security' and 'equity'. Taking these other forms of benefit into account may impact on the cost-effectiveness ratios and change the ranking order.

Table 1. Cost-effectiveness of interventions to prevent CVD in the total Indigenous population aged 35+ from mainstream GP practices or ACCHSs

	Mainstream GP	practice	ACCHS		
Intervention	Cost per DALY (95% uncertainty range)	Probability of being under \$50,000/DALY	Cost per DALY (95% uncertainty range)	Probability of being under \$50,000/DALY	
Polypill \$50	Health gain with cost saving	100%	\$750 (dominant*-\$6,600)	\$750 100% dominant*-\$6,600)	
Polypill \$100	Health gain with cost saving	100%	\$3,000 (dominant*-\$9,000)	100%	
Polypill \$150	Health gain with cost saving (dominant <sup>*</sup> -\$2,200)	100%	\$5,300 (dominant*-\$11,000)	100%	
Polypill \$200	Health gain with cost saving (dominant*-\$4,600)	100%	\$7,500 (\$1,000-\$14,000)	100%	
Polypill \$500	\$13,000 (\$6,800-\$20,000)	100%	\$21,000 (\$14,000-\$29,000)	100%	
Low dose diuretics	\$11,000 (\$1,600-\$25,000)	100%	\$30,000 (\$17,000-\$57,000)	95%	
ACEi	\$31,000 (\$19,000-\$57,000)	95%	\$51,000 (\$33,000-\$89,000)	48%	
Statins	\$59,000 (\$49,000-\$71,000)	5%	\$80,000 0% (\$66,000-\$97,000)		
Looma**	-	-	\$390,000 (\$380,000-\$400,000)	0%	

\* Dominant means the cost-effectiveness ratio falls in the south-east quadrant, where more benefits can be achieved at a lower cost (ie. health gain with cost saving).

\*\* Looma intervention only applies to remote regions and age group 20+

Table 2. Cost-effectiveness ratios of interventions to prevent CVD in the Indigenous population aged 35+ in non-remote and remote regions from mainstream GP practices or ACCHSs

	Mainstream GP p Non-remote	ractice – e*	ACCHS – Non-remote		ACCHS – Remote	
Intervention	Cost per DALY (95% uncertainty range)	Prob < \$50,000/ DALY	Cost per DALY (95% uncertainty range)	Prob < \$50,000/ DALY	Cost per DALY (95% uncertainty range)	Prob < \$50,000/ DALY
Polypill \$50	Health gain with cost saving	100%	Health gain with cost saving (dominant*-\$3,400)	100%	\$7,900 (\$220-\$17,000)	100%
Polypill \$100	Health gain with cost saving	100%	\$220 (dominant*-\$5,700)	100%	\$10,000 (\$2,500-\$19,000)	100%
Polypill \$150	Health gain with cost saving (dominant <sup>*</sup> -\$1,500)	100%	\$2,300 (dominant*-\$8,000)	100%	\$13,000 (\$4,800-\$22,000)	100%
Polypill \$200	Health gain with cost saving (dominant <sup>*</sup> -\$3,700)	100%	\$4,400 (dominant*-\$10,000)	100%	\$15,000 (\$7,100-\$25,000)	100%
Polypill \$500	\$12,000 (\$5,500-\$18,000)	100%	\$17,000 (\$10,000-\$24,000)	100%	\$30,000 (\$21,000-\$41,000)	100%
Low dose diuretics	\$11,000 (\$2,200-\$26,000)	100%	\$23,000 (\$10,000-\$45,000)	99%	\$51,000 (\$31,000-\$90,000)	48%
ACEi	\$29,000 (\$17,000-\$53,000)	96%	\$42,000 (\$26,000-\$74,000)	76%	\$72,000 (\$48,000-\$120,000)	4%
Statins	\$55,000 (\$45,000-\$66,000)	18%	\$68,000 (\$55,000-\$84,000)	0%	\$110,000 (\$86,000-\$130,000)	0%
Looma**	-	-	-	-	\$390,000 (\$380,000-\$400,000)	0%

\* Remote analysis not done for mainstream services due to minimal provision of mainstream services to the Indigenous population in remote regions

\* Looma intervention applies to age group 20+

The polypill intervention is generally the most cost-effective intervention for the Indigenous population, resulting in health gains with cost savings when delivered from mainstream GP practices at prices up to \$200 for an annual supply, and having a 100% chance of falling below the \$50,000 cost-effectiveness threshold when delivered from all health service types and for all prices up to \$500. Low dose diuretics and ACE inhibitors are also cost-effective options. It should be noted that as these analyses are modelled on targeting the Indigenous population aged 35+, if only those individuals with high CVD risk were targeted, this would result in even lower cost-effectiveness ratios than presented here.

In Table 2, the interventions have been evaluated according to remoteness. This is in recognition of the differences in underlying demographics and considers health service delivery for Indigenous populations living in remote as opposed to non-remote areas. Remoteness has been classified according to the ARIA+ remoteness classification of usual residence. It can be seen that the cost-effectiveness ratios are higher in remote regions for all interventions, primarily due to the greater costs associated with health service provision.

A selection of the interventions are presented graphically (Figures 1-3). The interventions all fall in the north-east ('health gain at a cost') and southeast ('health gain and net cost saving') quadrants of the cost-effectiveness plane.

Figure 1. Cost-effectiveness of CVD pharmacological interventions for the total Indigenous pop aged 35+ illustrated on a cost-effectiveness plane with \$50,000 per DALY threshold line





Figure 2. Cost-effectiveness of polypill interventions for the total Indigenous pop aged 35+ illustrated on a cost-effectiveness plane with \$50,000 per DALY threshold line





Lifetime DALYs averted (Thousands)

Figures 1 and 2 show that there is more health gain (more lifetime DALYs are averted) when interventions are delivered to the Indigenous population via ACCHSs compared to mainstream GP services (further to the right on the X-axis), despite being less 'cost-effective' (i.e. having higher cost-effectiveness ratios). Therefore, it is important that cost-effectiveness ratios are interpreted with reference to this broader context when the total amount of health gain is important (as it is in attempting to reduce the Indigenous health gap).

In Figure 3, it can be seen that interventions to remote populations are less cost-effective, since it is more expensive to deliver health care equitably to remote regions. Note that the Looma intervention may appear to have less uncertainty due to the availability of direct evidence of effectiveness, rather than requiring translation from mainstream evidence using the IHSD Template.

### 6. CONCLUSIONS

Interventions to prevent cardiovascular disease in the Australian Indigenous population have the potential to greatly reduce the Indigenous health gap. Particularly, the polypill (with realistic assumptions on coverage and adherence) could address up to 23% of the cardiovascular disease health gap if delivered through ACCHSs and up to 15% of the cardiovascular disease health gap if delivered through mainstream services. This can be achieved at cost savings, and is strongly recommended.

Addressing Indigenous health inequities will require additional investment in the delivery of health interventions via appropriate services. More total health gain can be achieved if interventions are delivered via ACCHSs compared to mainstream GP health services, and although these appear to be less 'cost-effective', such investment should be considered on equity grounds. Similarly, although less cost-effective, equity concerns dictate that investments are still warranted in remote as opposed to non-remote areas. These equity issues require consideration in the context of differences in the level of health disadvantage and treatment costs. There are several ways of integrating equity and cost-effectiveness concerns. One method would be to determine a higher threshold of what we consider a cost-effective intervention e.g. by multiplying the threshold by a measure that quantifies the Indigenous health gap, such as the 2.5 higher DALY rates from the Burden of Disease in Aboriginal and Torres Strait Islander Populations study. If we would adopt that approach, an intervention costing less than \$125,000 per DALY would be considered cost-effective if it benefits the Indigenous population. An alternative method would be via the application of equity weights in the calculation of cost-effectiveness ratios.

It is also important to consider broader concepts of benefit beyond the DALY for the Indigenous population, particularly when evaluating community-based interventions where community and socio-cultural benefits play an important role in addition to improvements in individual health. Finally, there is potential to refine the modelling to target treatment at those with high CVD risk if access to unit record survey data on risk factors can be obtained.

For more information on this topic area, please visit website www.sph.uq.edu.au/bodce-ace-prevention

# **ACE-PREVENTION PAMPHLETS**

# 7. ABOUT ACE-PREVENTION

To aid priority setting in prevention, the Assessing Cost-Effectiveness in Prevention Project (ACE-Prevention) applies standardised evaluation methods to assess the cost-effectiveness of 100 to 150 preventive interventions, taking a health sector perspective. This information is intended to help decision makers move resources from less efficient current practices to more efficient preventive action resulting in greater health gain for the same outlay.

### **PAMPHLETS IN THIS SERIES**

#### Methods:

- A. The ACE-Prevention project
- B. ACE approach to priority setting
- C. Key assumptions underlying the economic analysis
- D. Interpretation of ACE-Prevention cost-effectiveness results
- E. Indigenous Health Service Delivery

## **Overall results**

- 1. League table
- 2. Combined effects

### Indigenous population results

- 1. Cardiovascular disease prevention
- 2. Diabetes prevention
- 3. Screening and early treatment of chronic kidney disease

### **General population results**

- 1. Adult depression
- 2. Alcohol
- 3. Blood pressure and cholesterol lowering
- 4. Cannabis
- 5. Cervical cancer screening, Sunsmart and PSA screening
- 6. Childhood mental disorders
- 7. Fruit and vegetables
- 8. HIV 9. Obe
  - . Obesity
- 10. Osteoporosis
  11. Physical activity
- 12. Pre diabetes screening
- 13. Psychosis
- Develues
- 14. Renal replacement therapy, screening and earlytreatment of chronic kidney disease
- 15. Salt
- 16. Suicide prevention
- 17. Tobacco



